TENNESSEE HIGHER EDUCATION COMMISSION

Agenda Item: I.A.2.

DATE: November 18, 2004

SUBJECT: Middle Tennessee State University, Masters of Science in Professional Science with concentrations in Biostatistics, Biotechnology and Health Care Informatics

ACTION RECOMMENDED: Approval

BACKGROUND INFORMATION: In 2002, MTSU conducted a feasibility study funded by the Alfred Sloan Foundation and the Council of Graduate Schools to assess the need and potential viability for a Master of Science in Professional Science. MTSU was one of two institutions in Tennessee invited by the Sloan Foundation/Council of Graduate Schools to participate in the study and the only institution of higher education in Tennessee to receive funding to design the program. The decision to proceed to propose this degree, along with the choice of concentrations, was based on the finding of the study. The goal of the proposed graduate program is to enhance linkages between science and business through a curriculum that encompasses science, mathematics, and education. As recognized by the Sloan Foundation, MTSU produces a substantial number of graduates with Master's degrees in the sciences when compared to similar institutions nationally.

PROPOSED START-UP DATE: Upon approval

Commission staff has reviewed program proposals according to the academic standards adopted by the Commission on November 14, 2002. Each standard is referenced below.

1.1.20A MISSION: The proposed program is consistent with the university mission of offering an extensive range of programs that primarily serve students of Middle Tennessee.

1.1.20B CURRICULUM: The proposed curriculum requires the completion of 36 semester credit hours (major core, 15 hours; concentration, 21 hours). Five new courses are required for the curriculum.

Course Title	Credit Hours
Introduction to Biostatistics	1
Biostatistical Methods	3
Advanced Biostatistical Methods	3
Issues in Biotechnology	2
Trends in Health Care & Technology	1
	10

The curriculum is designed based on the model recommended by the Sloan Foundation. The interdisciplinary structure utilizes existing courses within six

academic departments (Biology, Nursing, Mathematics, Physics, Chemistry and Finance), across two colleges (College of Business and the College of Basic and Applied Sciences). The proposed concentrations are as follows:

Biostatistics Concentration requires students to successfully complete Multivariate Calculus or Linear Algebra, as a requirement for admission. Biostatistics is the science of transforming biological data into knowledge about biological processes. Common applications include clinical medicine, epidemiologic studies, biological laboratory and field research, genetics, environmental health, health services, ecology, fisheries and wildlife biology, agriculture, and forestry.

Biotechnology Concentration requires students to have either an undergraduate major in Biology or Chemistry, including a genetics course, or an organic chemistry course, and at least three undergraduate courses related to biotechnology, including genetics. Students in this concentration are preparing for careers in the management of bioscience firms and organizations. Examples of opportunities in this field include research science positions in laboratories applying biotechnology to problems in medicine, industry, and agriculture and management positions in the biotechnology and pharmaceutical industry. With the growing biotechnology industry in Tennessee and nationwide, the demand for persons with training in both biological science and management is expected to grow significantly.

Health Care Informatics Concentration requires students to have an undergraduate degree with a major in a health care field or work experience in health-related field. Applicants without a relevant degree or work experience may be admitted but will be required to complete appropriate prerequisite coursework that includes a medical terminology course. Health Care Informatics, previously known as Medical Informatics, is the discipline that now plays an important role in all aspects of healthcare delivery, and public/personal health promotion. There are currently various definitions for medical informatics but it is essentially the use and sharing of information within the healthcare sector with the help of computer science, mathematics and psychology. Graduates of this concentration are expected to fill the growing need for health care administrators with training to apply information technology to health care delivery.

1.1.20C ACADEMIC STANDARDS: Admission, retention, and graduation requirements for the proposed program are the same as the standard university requirements for graduate programs, as specified in the Graduate Catalog. Additionally, applicants must have the appropriate undergraduate preparation for each area of concentration.

Projected Program Productivity

Student Projections	Full-time Equivalent	Part-time	Graduates
Year 1	9	4	0
Year 2	20	8	5
Year 3	24	10	9
Year 4	33	16	15
Year 5	45	20	20

1.1.20D FACULTY: The consultant expressed concern that the main responsibility for teaching discipline-specific courses in the Healthcare Informatics concentration is supported by one adjunct faculty member. While this person is eminently qualified, the concern is that she is in adjunct status and if she were to leave the university, the concentration could not be taught until a replacement is found. The consultant recommended either permanently hiring the adjunct faculty person, training another faculty member to teach Informatics, or recruiting an additional full time faculty.

1.1.20E LIBRARY RESOURCES: Although most reference materials can be assessed by electronic means, the consultant's assessment of the current library indicated a lack of some of the essential holdings needed to support the proposed program and recommended that a thorough assessment of library holdings be conducted to "fill the gaps" and also provided a list of discipline-specific resources to assist with the assessment process.

1.1.20F ADMINISTRATION/ORGANIZATION: The proposed program is housed in the College of Basic and Applied Sciences. Half-time re-assignment of one faculty position will serve as the program coordinator, rotating on three-year terms.

1.1.20G SUPPORT RESOURCES: The Sloan Foundation and the Council of Graduate Schools have assisted in developing the curriculum for the proposal and will monitor the implementation and progress of the program.

1.1.20H FACILITIES/INSTRUCTIONAL EQUIPMENT: Current facilities and instructional equipment are appropriate to support the needs of the proposed program.

1.1.20I STUDENT/EMPLOYER DEMANDS: A survey of students indicates strong interest in the program. The survey identified 120 students interested in at least one of the concentrations. MTSU estimates that 10 percent of these students will actually enroll in the program. The consultant considered this to be a conservative estimate. In terms of employment opportunities for graduates, MTSU has already established relationships with potential employers to provide internship sites for students in biotechnology. As one of the newest competency areas in for health care professionals, graduates in Informatics are in high demand. The Occupational Outlook Handbook indicates that ¾ of the 7 million new jobs developed by 2010 are expected to be in occupations in computer and mathematics, healthcare, technical educational training and library operations.

1.1.20J NO UNNECESSARY DUPLICATION: There are no other programs of this type offered by public or private institutions in the state. Similar programs are offered at North Carolina State University and Georgia Tech.

1.1.20K COOPERATIVE INSTITUTIONS: None indicated; however, THEC will encourage collaboration with new Public Health programs in developmental stages at Tennessee State University. Informatics will be an essential component of the curriculum for programs in the health care professional.

1.1.20L DESEGREGATION: MTSU conducted a desegregation impact study and established measures that will be taken to enhance racial diversity of the institution. TBR staff reviewed the data and found that the proposed program will have no negative impact on desegregation efforts of other institutions in Middle Tennessee and will not infringe on or diminish the educational mission of any other institution to impede the state's effort to achieve racial diversity.

1.1.20M ASSESSMENT/EVALUATION AND ACCREDITATION: There are no accrediting bodies for this specific program; however, the curriculum is structured based on recommendations from the Sloan Foundation and Council of Graduate Schools and is consistent with SACS guidelines. The program evaluations will be conducted annually for the first five years following approval by the Office of Institutional Effectiveness. The evaluation will include student and alumni surveys, and the assessment of an external consultant, industry partners, and intern sites.

1.1.20N ARTICULATION: N/A

1.1.20O EXTERNAL JUDGMENT (Graduate Programs): Dr. Donna Larson, R.N., Associate Dean of Science and Mathematics at Grand Valley State University in Allendale, Michigan reviewed the proposal and conducted a site visit on July 21, 2004. In her report she made a few recommendations which were addressed in a response from MTSU in a positive manner. Dr. Larson recommended approval of the proposed program and offered the following comment: "My best professional judgment is that this new Masters of Science in Professional Science program with its three concentrations will be a winner for Middle Tennessee State University. There is tremendous opportunity and need for graduates from this kind of program, and MTSU is well suited and prepared to offer the program."

1.1.20P COST/BENEFIT/SOURCE: The costs are addressed through the Sloan Foundation/Council of Graduate Education Grant. There are several benefits to justify offering the proposed Master of Science in Professional Science. Over the last few years, curriculum changes reflect a more multi-disciplinary or inter-disciplinary structure. The proposed program offers a well developed curriculum, an interested student body, and a potential employment base, requiring minimum additional state resources. Graduates will facilitate the state's commitment to address workforce issues and to develop higher level science-based jobs. Proposed estimated budget:

	Year 1	Year 2	Year 3	Year 4	Year 5
1. Expenditures					
A. One – time:					
New/renovated space	$0	$0	$0	$0	$0
Equipment	$0	$0	$0	$0	$0
Library	$0	$0	$0	$0	$0
Consultants[1]	$3,500	$2,500	$0	$0	$1,500
Other	$14,000	$14,000	$0	$0	$0
Total for One-time Expenditures	$17,500	$16,500	$0	$0	$1,500
B. Recurring:					
Administration	$14,800	$14,800	$8,000	$8,000	$8,000
Faculty	$8,000	$8,000	$8,000	$8,000	$8,000
Staff	$9,250	$19,000	$19,000	$20,000	$20,500
Benefits	$5,701	$7,378	$6,178	$6,354	$6,442
Equipment	$1,500	$1,500	$1,500	$1,500	$1,500
Library	$0	$0	$0	$0	$0
Travel	$2,000	$4,000	$2,000	$2,000	$2,000
Other	$6,500	$3,500	$4,000	$4,000	$4,000
Total for Recurring Expenditures	$47,751	$58,178	$48,678	$49,854	$50,442
TOTAL (A + B)	$65,251	$74,678	$48,678	$49,854	$51,942
Revenues					
State appropriations (new, FTE)		$0	$0	$0	$0
State appropriations (old)		$0	$0	$0	$0
Tuition/Fees[2]		$40,896	$45,540	$59,202	$79,695
Institutional Resources	$0	$0	$0	$0	$0
Grants/Contracts[3]	$0	$35,000	$0	$0	$0
Gifts	$18,216	$0	$0	$0	$0
Other (in-kind donations, etc.)[4]	$0	$0	$15,000	$15,000	$0
	$70,000				
	$0	$75,896	$60,540	$74,202	$79,695
	$0				
TOTAL REVENUES[5]	$88,216				

1. As part of the Sloan Foundation grant, money was provided for an external consultant for program development and an external reviewer after program implementation.

2. Tuition/Fees revenue is estimated conservatively using only full-time (9 hour) student enrollment projections and calculating only in-state tuition rates.

MTSU has been awarded a grant of $105,000 from the Alfred Sloan Foundation to support the implementation. The program is viable based exclusively on funds generated by the implementation grant and tuition/fees paid by students. Donations are also anticipated from industry partners.

1.1.30 POST APPROVAL MONITORING: An annual performance review of the proposed program will be conducted for the first five years following approval. The review will be based on goals established in the approved program proposal. At the end of this period, campus, governing board, and Commission staff will perform a summative evaluation. These goals include, but are not limited to enrollment and graduation numbers, program costs, progress toward accreditation, library acquisitions, student performance and other goals set by the institution and agreed upon by governing board and Commission staff. As a result of this evaluation, if the program is found to be deficient, the Commission may recommend that the governing board terminate the program. Copies of such recommendation will be forwarded to the Education Committees of the General Assembly. The Commission may also choose to extend this period if additional time is needed and requested by the governing board.